

Master in Political Ecology
Academic year:2018-2019

ANALYZING SOCIETY'S METABOLISM

Arnim Scheidel

Postdoctoral Researcher at ICTA-UAB

http://ictaweb.uab.cat/personal_detail.php?id=186

arnim.scheidel@gmail.com

Anke Schaffartzik

Postdoctoral Fellow in the ICTA-UAB María de Maeztu Unit of Excellence

http://ictaweb.uab.cat/personal_detail.php?id=4068

anke.schaffartzik@uab.cat

Objectives

After having completed this course, students will understand the basic theoretical background of and conceptual framework for analyses of society's metabolism as well as the two most common approaches in its quantitative study. They will be familiar with the respective uses and benefits of Multi-Scale Integrated Analysis of Societal and Ecosystem Metabolism (MuSIASEM) and economy-wide Material Flow Accounting (ew-MFA) and will be able to discuss weaknesses and limitations of each approach. Hands-on data work using spreadsheet software (e.g., MS Excel, OpenOffice.org Calc, etc.) will familiarize students with the data required, estimation procedures, and data grouping on which quantitative analyses of society's metabolism are based as well as with the general nature of such accounts and the results they produce. On this basis, students will be able to develop informed opinions on current policy debates, especially environmental and sustainability policies, to which the quantification of society's metabolism is pertinent.

Structure

The course will be held in four sessions all of which will involve a mix of different learning methods. Reading material (academic publications, news articles, and opinion pieces) and teaching will form the basis for a discussion of expected benefits and limits of applied metabolism analysis in the first session. The (longer) second and third sessions will combine teaching with hands-on data work to give the students not only a theoretical put also a practical idea of how socio-metabolic analyses may be conducted. The final session will take up a current public debate related to society's metabolism and challenge the students to contribute to this debate in light of their new knowledge and experiences from the course.

Exam

This course forms part of module 5 and the students may choose to conduct a simplified socio-metabolic analysis (individually or in a team of 2-3 students) as the basis for their evaluation in module 5. For this, students will be provided with raw data that they can use

for different types of socio-metabolic analyses. They will be asked to write a short article presenting their results and discussing how and why these are of general interest. This should be a blog-post-style, generally accessible piece of writing. The students will be asked to submit their calculation spreadsheets along with the article and will be graded on the execution of the analysis as well as the presentation of the results.

Homework

Reading is assigned before the first and the fourth session. Before the fourth session, it may additionally be necessary for students to meet briefly in their groups to prepare a short presentation of their work.

The following reading is not required but recommended and can be read anytime during (or before or after) the course:

Gerber, J.-F., Scheidel, A., 2018. In Search of Substantive Economics: Comparing Today's Two Major Socio-metabolic Approaches to the Economy – MEFA and MuSIASEM. *Ecological Economics* 144, 186–194. <https://doi.org/10.1016/j.ecolecon.2017.08.012>

Schaffartzik, A., Mayer, A., Gingrich, S., Eisenmenger, N., Loy, C., Krausmann, F., 2014. The global metabolic transition: Regional patterns and trends of global material flows, 1950–2010. *Global Environmental Change* 26, 87–97. <https://doi.org/10.1016/j.gloenvcha.2014.03.013>

Program outline

1. Introduction to social metabolism analysis (2 hours)

Short lecture by Arnim Scheidel and Anke Schaffartzik on theoretical background of metabolism analysis and on the premises of MuSIASEM and ew-MFA as tools for its study as well as brief overview of the type of results generated by such studies. Discussion of opportunities and limits of the metabolism concept and the approaches.

Required reading before the class:

Fischer-Kowalski, M., Krausmann, F., Giljum, S., Lutter, S., Mayer, A., Bringezu, S., Moriguchi, Y., Schütz, H., Schandl, H., Weisz, H., 2011. Methodology and Indicators of Economy-wide Material Flow Accounting. *Journal of Industrial Ecology* 15, 855–876. <https://doi.org/10.1111/j.1530-9290.2011.00366.x>

Giampietro, M., Bukkens, S., 2014. The Multi-scale Integrated Analysis of Societal and Ecosystem Metabolism. In: Giampietro, M., Aspinall, R., Ramos-Martín, J., Bukkens, S. (Eds.), *Resource Accounting for Sustainability Assessment: The Nexus between Energy, Food, Water and Land Use*. Routledge, London, pp. 11–21

2. Data in the raw (3hours)

Presentation of data sources and requirements for different metabolism analysis (i.e. MuSIASEM and MFA), advantages and disadvantages, estimation and gap-filling
For this session, students will either bring their own laptops with their choice of spreadsheet software (open source welcome) installed or will be provided with access to a computer/laptop (at least 1 computer for every 2 students)

Hands-on: Organizing raw data in spreadsheet software for either MuSIASEM or MFA analysis.

3. Conducting metabolic analysis (3 hours)

A brief input will be given by the instructors on data analyses in practice, data representation, accounting conventions, indicators, interpretability
For this session, students will either bring their own laptops with their choice of spreadsheet software (open source welcome) installed or will be provided with access to a computer/laptop (at least 1 computer for every 2 students)

Hands-on: Preparation of simplified metabolism analysis (either MuSIASEM or MFA) from data organized in session 2

4. What does it all mean? (2 hours)

In this session groups of students will very briefly present the main results from their hands-on work in session 2 and 3. This will form the basis of a guided discussion of what types of insights metabolism analysis can and can't provide and what auxiliary information might be required.

Required reading before the class:

Several timely newspaper articles on sustainability concerns will be provided by the instructors before the class that will be discussed in relation to the knowledge gained through socio-metabolic analyses.